

REMARKS

Claims 1-4 and 7-31 are pending, with claim 1 being independent.

Request for Interview

In the Final Office Action of October 12, 2006, the Examiner has continued to rely on Chow (U.S. Patent No. 5,157,240) as the primary reference in the rejections of the claims, as he did in the Office Action of September 8, 2004, the Final Office Action of March 1, 2005, the Office Action of June 22, 2005, the Final Office Action of November 17, 2005, the Advisory Action of March 1, 2006, and the Office Action of May 2, 2006. During the prosecution of this application, the applicants have presented many different arguments pointing out that Chow does not disclose or suggest various features of the claims, but the Examiner has kept coming up with new interpretations of Chow in order to maintain the rejections based on Chow. In light of this, the applicants are of the opinion that an interview would be very helpful at this time. Accordingly, the applicants hereby request an interview, and will attempt to contact the Examiner in the near future to schedule an interview. However, if the Examiner is ready to consider this Amendment before an interview has been scheduled, it is respectfully requested that the Examiner contact the undersigned attorney to schedule an interview before acting on the Amendment.

Amendment After Final Rejection of February 7, 2006, Is Not To Be Entered

On page 1 of the Amendment of March 16, 2006, the applicants requested that the Amendment After Final Rejection of February 7, 2006, not be entered. However, the image file wrapper of the application still indicates that the Amendment After Final Rejection of February 7, 2006, is to be entered. It is respectfully requested that the Examiner have the image file wrapper of the application corrected to indicate that the Amendment After Final Rejection of February 7, 2006, is not to be entered. The applicants made this same request on page 7 of the Amendment of July 27, 2006, but the Examiner did not respond to this request in the Final Office Action of October 12, 2006.

Request for Acceptance of Replacement Sheets of Drawings Filed on March 16, 2006

Four replacement sheets of drawings were filed with the Amendment of March 16, 2006, but the Office Action of May 2, 2006, does not indicate whether these replacement sheets of drawings have been accepted. Accordingly, it is respectfully requested that the Examiner indicate whether these replacement sheets of drawings have been accepted in the next Office Action. The applicants made this same request on page 7 of the Amendment of July 27, 2006, but the Examiner did not respond to this request in the Final Office Action of October 12, 2006.

Claim Rejections Under 35 USC 103

Rejection 1

Claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31 were rejected under 35 USC 103(a) as being unpatentable over Chow (U.S. Patent No. 5,157,240) in view of Chandler (U.S. Patent No. 2,799,764) or Isaacson et al. (U.S. Patent No. 3,842,241). This rejection is respectfully traversed.

At the outset, it is noted that the Examiner has not specifically referred to any of claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31 in explaining the rejection, which makes it difficult for the applicants to respond to the rejection. The Examiner merely provides a narrative in which he states that Chow, Chandler, and Isaacson allegedly disclose or suggest various features without identifying which claim or claims his comments pertain to. Accordingly, should the Examiner repeat this rejection, it is respectfully requested that the Examiner specifically identify which claim or claims his comments pertain to, even if the next Office Action is an Advisory Action.

Claims 1 and 23—"heat-resistant layer" features

It is submitted that Chow, Chandler, and Isaacson do not disclose "a heat-resistant layer formed on a surface of the cover heater" as recited in independent claim 1, or "a heat-resistant layer on the surface of the body heater" as recited in dependent claim 23.

The Examiner considers protective layer 25' of cover 11 in Figs. 2 and 4 of Chow to be "a heat-resistant layer formed on a surface of the cover heater" as recited in claim 1. Chow's protective layer 25' is described as follows in column 5, lines 46-48, of Chow:

Again, a pyrolytic boron nitride outer protective layer, 25', covers the structure shown therebelow in FIGS. 2 and 4.

The purpose of Chow's protective layer 25' is described as follows in column 6, lines 29-35, of Chow:

Also, the covering of heating elements 22' and 24' by protective layer 25' keeps them from being exposed directly to the substrate on which thin films are being deposited. This avoids the incorporation into the films being deposited of contaminants arising from the heating of these heating elements.

However, it is submitted that nothing whatsoever in the above passages of Chow or in any other portion of Chow indicates that Chow's protective layer 25' is "a heat-resistant layer" as recited in claim 1 as alleged by the Examiner.

Furthermore, the Examiner considers protective layer 25 that covers the body heater as shown in Figs. 1-3 and 7 of Chow to be "a heat-resistant layer on the surface of the body heater" as recited in claim 23. Chow's protective layer 25 and its purposed are described as follows in column 4, line 60, through column 5, line 3, of Chow:

All of this structure on the outer side of shell 20 is then finally covered by a protective layer, 25, of pyrolytic boron nitride, again deposited using a well known chemical vapor deposition process to a thickness of 1.0 to a few mils. Protective layer 25 prevents outer conductor 24 therebeneath from adsorbing gaseous impurities when out in the open which could later outgas at the crucible operating temperatures. Further, the pyrolytic graphite in outer heater 24, in the absence of protective layer 25, may react with residual molecules occurring thereabout even after a hard vacuum has been pulled therein.

However, it is submitted that nothing whatsoever in the above passage of Chow or in any other portion of Chow indicates that Chow's protective layer 25 is "a heat-resistant layer" as recited in claim 23 as alleged by the Examiner.

Nevertheless, the Examiner considers Chow's protective layers 25 and 25' to be a "heat-resistant layer" as recited in claims 1 and 23 because paragraph [0035] of the applicants' specification as originally filed states that "the heat-resistant layer 46, which is formed on the cover heater 43, is formed as a thin film type on the cover body 41," and column 4, line 60, through column 5, line 3, of Chow states that Chow's protective layer 25 has "a thickness of 1.0 to a few mils" which the Examiner considers to be "a thin material." The Examiner's rationale is

that since the applicants disclose that the heat-resistant layer 46 is formed as a thin film type, and since Chow discloses that Chow's protective layer 25 is a thin material, then Chow's protective layers 25 and 25' are a "heat-resistant layer" as recited in claims 1 and 23.

The Examiner has apparently concluded that the statement that "the heat-resistant layer 46 . . . is formed as a thin film type" in paragraph [0035] of the applicants' specification as originally filed means that any layer that is formed as a thin film type, i.e., as a thin layer, is a "heat-resistant layer" as recited in claims 1 and 23. However, if the Examiner's position were correct, then a thin layer of any material, such as frozen hydrogen, water, liquid sodium, or aluminum, would also be a "heat-resistant layer" merely by reason of being thin, regardless of whether the thin layer in question actually has a heat-resistant property. Accordingly, it is submitted that the Examiner's position is both incorrect and unreasonable because it effectively ignores the limitation "heat-resistant" in the term "heat-resistant layer" recited in claims 1 and 23. In effect, the Examiner has interpreted claims 1 and 23 as if they recited a "thin layer," rather than a "heat-resistant layer."

It is submitted that in order for Chow's protective layer 25' to be "a heat-resistant layer formed on a surface of the cover heater" as recited in claim 1, and for Chow's protective layer 25 to be "a heat-resistant layer on the surface of the body heater" as recited in claim 23, the Examiner is required to show that Chow's protective layers 25' and 25 are in fact a "heat-resistant layer" as recited in claims 1 and 23. However, it is submitted that the Examiner has not made such a showing.

Claims 1 and 24—"reflective layer" features

It is submitted that Chow, Chandler, and Isaacson do not disclose or suggest "a reflective layer between the cover heater and the heat-resistant layer" as recited in claim 1, or "a reflective layer between the body heater and the heat-resistant layer" as recited in dependent claim 24.

Chandler

As recognized by the Examiner, Chow does not disclose "a reflective layer between the cover heater and the heat-resistant layer" as recited in claim 1, or "a reflective layer between the body heater and the heat-resistant layer" as recited in claim 24. However, the Examiner

considers these features to be disclosed by Chandler and Isaacson, and is of the opinion that it would have been obvious to incorporate these features of Chandler and Isaacson into Chow's device "to reflect the heat generated by the heater toward an intended heating direction."

With respect to Chandler, the Examiner considers Fig. 5 of Chandler to show that "the heating element (72) is provided on a heating surface (76) with a heat reflecting layer (62) disposed between the heating element and a heat resistant/insulating layer (78)."

However, as described in column 7, lines 35-38, of Chandler, layer 78 is "a backing layer 78 of paper, paperboard, cloth, or other suitable material," rather than being "a heat resistant/insulating layer" as alleged by the Examiner or a "heat-resistant layer" as recited in claims 1 and 24. Nevertheless, the Examiner considers Chandler's backing layer 78 to be a "heat-resistant layer" as recited in claims 1 and 24, stating as follows in the Final Office Action of October 12, 2006:

The disclose material of Chandler ["backing layer 78 of paper, paperboard, cloth, or other suitable material"] is capable of being a heat-resistant layer and there is no reason why this layer cannot be served as a heat-resistant layer. A layer that impedes a heat transfer maybe considered as a heat-resistant layer, and the applicant has not disclosed that such material would be contrary to the applicant's definition of the heat-resistant layer. There is no other showing in the applicant's claim how the heat-resistant layer is defined or shown to be distinguishable over the prior art. It is notoriously known to one of ordinary skill in the art as well as a lay person that a paper such as paper towel or cloth such as a kitchen towel is used to hold and remove a hot pan off a stove. This is notoriously practiced to show that a paper and cloth is used as a heat-resistant material to insulate or impede the heat transfer to the person holding such pan so the persons would not be burned.

However, it is further noted that the claims are interpreted in light of the specification, and the applicant is invited to point out where in the specification the heat-resistance layer is defined or shown to be distinguishable over the prior art. No new matter is to be introduced.

However, Chandler does not disclose that backing layer 78 is provided to serve as a "heat resistant layer" as recited in claims 1 and 24, and it is submitted that Chandler does not describe backing layer 78 in sufficient detail for one of ordinary skill in the art to recognize that backing layer 78 might arguably be capable of serving as a "heat-resistant layer" as recited in claims 1 and 24. Although Chandler discloses that backing layer 78 may be made of "paper,

paperboard, cloth, or other suitable material," and the Examiner is of the opinion that a person desiring to remove a hot pan from a stove may use a paper towel or a kitchen towel as "a heat-resistant layer" by holding the hot pan with the paper towel or the kitchen towel, it is submitted that nothing whatsoever in Chandler indicates that the "paper, paperboard, cloth, or other suitable material" of which backing layer 78 may be made might have the same heat-resistant properties that the Examiner attributes to a paper towel. Furthermore, it appears that backing layer 78 is provided merely to provide a smooth surface for mounting Chandler's panel heating device on a wall substantially in the manner of wall paper as described in column 1, lines 17-21, of Chandler. As can be seen from FIG. 5 of Chandler, backing layer 78 is provided adjacent to corrugated reflective layer 62 which does not have a smooth surface. In contrast, the embodiments in FIGS. 3 and 8 of Chandler do not have a backing layer. The back layer in these embodiments is a reflective layer 38 or 80. Although the embodiment in FIG. 9 of Chandler has a backing layer 106, this backing layer 106 has a polished or shiny surface 108, and thus is equivalent to the reflective layers 38 and 80 in FIGS. 3 and 8. It is submitted that if backing layer 78 in FIG. 5 of Chandler were being provided to serve as a "heat-resistant layer" as alleged by the Examiner, then such a backing layer would also be provided in the embodiments disclosed in FIGS. 3, 8, and 9 of Chandler, which is not the case as discussed above.

In any event, it is submitted that the only suggestion that Chandler's backing layer 78 might serve as a "heat-resistant layer" as recited in claims 1 and 24 is contained in the applicants' disclosure, which the Examiner cannot rely on as a basis to reject the applicants' claims. That is, it is submitted that the only way that it might occur to one of ordinary skill in the art that Chandler's backing layer 78 might serve as a "heat-resistant layer" as recited in claims 1 and 24 is by reading the applicants' disclosure. Accordingly, it is submitted that the Examiner's position that Chandler's backing layer 78 might serve as a "heat-resistant layer" as recited in claims 1 and 24 is based solely on an impermissible hindsight reconstruction of the present invention arrived at by reading the applicants' disclosure.

Isaacson

With respect to Isaacson, the Examiner considers Figs. 2 and 3 of Isaacson to show "a heating surface (14) upon which a heating element (50) provided thereto with a heat reflective layer (56) disposed between the heating element and a heat resistant layer (40)."

However as described in column 2, lines 46-48, of Isaacson, element 40 is "a holder 40 which may be in the form of a picture frame holder and constructed of plastic," rather than being "a heat resistant layer" as alleged by the Examiner or a "heat-resistant layer" as recited in claims 1 and 24. Nevertheless, the Examiner considers Isaacson's holder 40 to be a "heat-resistant layer" as recited in claims 1 and 24, stating as follows in the Final Office Action of October 12, 2006:

Likewise, with respect to Isaacson, the applicant argues the layer 40 which is disclosed as a holder constructed of plastic, is not the heat-resistant layer. But this argument is not deemed persuasive since there is no reason why this layer cannot be a heat-resistant layer as it provides the support and protection to the heater.

However, Isaacson does not disclose that holder 40 is provided to serve as a "heat resistant layer" as recited in claims 1 and 24, and it is submitted that Isaacson does not describe holder 40 in sufficient detail for one of ordinary skill in the art to recognize that holder 40 might arguably be capable of serving as a "heat-resistant layer" as recited in claims 1 and 24. Furthermore, it is not seen what purpose might be served by making holder 40 serve as a "heat-resistant layer" as recited in claims 1 and 24 because holder 40 is exposed to the air, and thus does not contact anything which holder 40 might arguably protect from the heat generated by heater element 50 by serving as a "heat-resistant layer" as recited in claims 1 and 24, particularly since reflective layer 56 reflects the heat generated by heater element 50 away from holder 40 toward the surface of the aquarium tank 10 shown in FIG. 1 of Isaacson as described in column 3, lines 5-8, of Isaacson.

In any event, it is submitted that the only suggestion that Isaacson's holder 40 might serve as a "heat-resistant layer" as recited in claims 1 and 24 is contained in the applicants' disclosure, which the Examiner cannot rely on as a basis to reject the applicants' claims. That is, it is submitted that the only way that it might occur to one of ordinary skill in the art that Isaacson's holder 40 might serve as a "heat-resistant layer" as recited in claims 1 and 24 is by reading the applicants' disclosure. Accordingly, it is submitted that the Examiner's position that Isaacson's holder 40 might serve as a "heat-resistant layer" as recited in claims 1 and 24 is based solely on an impermissible hindsight reconstruction of the present invention arrived at by reading the applicants' disclosure.

Claims 2 and 18

It is submitted that Chow, Chandler, and Isaacson do not disclose the feature "wherein the entire cover heater is constituted by a single wire pattern formed over the entire top surface of the cover, the single wire pattern of the entire cover heater having a positive terminal at a first end of the single wire pattern and a negative terminal at a second end of the single wire pattern" recited in dependent claim 2, or the feature "wherein the entire body heater is constituted by a single wire pattern formed over at least the entire outer side wall of the main body, the single wire pattern of the entire body heater having a positive terminal at a first end of the single wire pattern and a negative terminal at a second end of the single wire pattern" recited in dependent claim 18, because the entire cover heater and the entire body heater in all of the embodiments disclosed in Chow are each constituted by two heating element patterns, rather than being constituted by a single wire pattern as recited in claims 2 and 18. See inner heating element 22' and outer heating element 24' of a cover heater in Figs. 2 and 4 of Chow which show more detailed views of cover 11 in Fig. 1 of Chow, and inner heating element 22" and outer heating element 24" of a cover heater in cover 11' in Fig. 7 of Chow. See first layer heating element 22 and second layer heating element 24 of a body heater in Figs. 1-3 and 7 of Chow. Nevertheless, the Examiner considers Chow to disclose or suggest an entire cover heater constituted by a single wire pattern as recited in claim 2 and an entire body heater constituted by a single wire pattern as recited in claim 18, stating as follows in the Final Office Action of October 12, 2006:

While Chow shows two wires, the claimed scope of "a single wire" is still met by Chow since single or one wire is included by two wires, each of the two wires being a single wire. Furthermore it is noted that Chow teaches that the heating element can be one or more (see column 2, lines 27-30). This clearly meets the claimed recitations.

However, the Examiner's statement that "the claimed scope of 'a single wire' is still met by Chow since single or one wire is included by two wires, each of the two wires being a single wire" does not address the feature of claim 2 "wherein the entire cover heater is constituted by a single wire pattern," or the feature of claim 18 "wherein the entire body heater is constituted by a single wire pattern," and thus ignores the fact that Chow's entire cover heater is constituted by two wire patterns 22' and 24' or 22" and 24", and the fact that Chow's entire body heater is constituted by two wire patterns 22 and 24.

It appears that column 2, lines 27-30, of Chow referred to by the Examiner is actually column 2, lines 26-29, which reads as follows:

The deposition source may have a crucible having a cover thereon with one or more apertures therein and one or more heating elements on that cover about such an aperture.

However, the above passage of Chow relates only to Chow's cover heater, and thus does not disclose the feature of claim 18 "wherein the entire body heater is constituted by a single wire pattern."

Furthermore, although the above passage of Chow may arguably appear to allude to an embodiment in which a cover heater may have one heating element, it appears that this is the only place in Chow where such an embodiment is alluded to. The rest of the specification of Chow, the abstract of Chow, all of the claims of Chow, and all of the drawings of Chow disclose embodiments in which a cover heater has two heating elements. In light of this, it appears that the apparent allusion in column 2, lines 26-29, of Chow to an embodiment in which a cover heater has one heating element is an error, such that Chow does not actually disclose or suggest the feature "wherein the entire cover heater is constituted by a single wire pattern" recited in claim 2. Alternatively, assuming *arguendo* that this apparent allusion is not an error, it is submitted that the mere reference to "one or more heating elements on that cover about such an aperture" in column 2, lines 26-29, of Chow does not provide an enabling disclosure with respect to the feature "wherein the entire cover heater is constituted by a single wire pattern" recited in claim 2. See MPEP 2121.01. In any event, it is submitted that the mere reference to "one or more heating elements on that cover about such an aperture" in column 2, lines 26-29, of Chow does not disclose or suggest the feature "the single wire pattern of the entire cover heater having a positive terminal at a first end of the single wire pattern and a negative terminal at a second end of the single wire pattern" recited in claim 2.

Claims 7 and 25

It is submitted that Chow, Chandler, and Isaacson do not disclose the feature "wherein the insulating material forming the cover has a good heat radiation property" recited in dependent claim 7, or the feature "wherein the insulating material forming the main body has a good heat radiation property" recited in dependent claim 25.

Chow's cover 11 or 11' and main body 20 are formed of pyrolytic boron nitride which appears to be an electrical insulating material in light of column 3, lines 46-49, of Chow. However, it is submitted that Chow, Chandler, and Isaacson do not disclose or suggest that pyrolytic boron nitride "has a good heat radiation property" as recited in claims 7 and 25. Nor has the Examiner shown that pyrolytic boron nitride "has a good heat radiation property" as recited in claims 7 and 25. Nevertheless, the Examiner considers Chow to disclose the "good heat radiation property" features of claims 7 and 25, stating as follows:

With respect to claims 7 and 25, the applicant argues that the recited insulating materials having a good heat radiation property defines over the insulating material pyrolytic boron nitride as shown in Chow. The applicant argues that because the material in Chow does not show that such material "has a good heat radiation property, it fails to meet claims 7 and 25. The applicant's attention is directed to MPEP 2112.01. It states that when the structure recited in the reference is substantially identical to the structure identical to that of the claims, claimed properties or functions are assumed to be inherent. In this case, the structure or the material recited is the "insulating material". It is also noted that there is other with respect to the composition of such insulating material. Given such a broad structure, the property relating to the heat radiation is presumed to be inherently met by Chow.

The Examiner's position appears to be that any insulating material "has a good heat radiation property" as recited in claims 7 and 25, and that since Chow's pyrolytic boron nitride is apparently an "insulating material" as recited in claims 7 and 25, Chow's pyrolytic boron nitride also "has a good heat radiation property" as recited in claims 7 and 25. However, it is submitted that the Examiner's apparent position is both incorrect and unreasonable because there are many different insulating materials having different heat radiation properties that are known in the art. In general, some of these different insulating materials have a poor heat radiation property, others have a moderate heat radiation property, and still others have a good heat radiation property. In the applicants' invention as recited in claims 7 and 25, the insulating material "has a good heat radiation property." In contrast, Chow does not disclose that pyrolytic boron nitride "has a good radiation property" as recited in claims 7 and 25, and in fact contains no discussion whatsoever relating to a heat radiation property of pyrolytic boron nitride. Nor has the Examiner shown that pyrolytic boron nitride "has a good heat radiation property" as recited in claims 7 and 25. Furthermore, the applicants do not merely disclose an insulating material that

"has a good heat radiation property" as recited in claims 7 and 25. Rather, the applicants disclose a specific example of such an insulating material—alumina (Al_2O_3). See, for example, the last sentence of paragraph [0034] of the specification.

Claim 9

As recognized by the Examiner, Chow, Chandler, and Isaacson do not disclose the feature "wherein the cover heater is formed in a concentric pattern around the nozzle" recited in dependent claim 9. However, the Examiner is of the opinion that it would have been obvious to modify Chow's cover heater to have this feature, stating as follows:

With respect to claim 9, Chow shows the cover having a nozzle in the center of the cover with a cover heater provided around the nozzle. However, while, Chow does not show that the cover heater concentric pattern around the nozzle, it would have been obvious to one of ordinary skill in the art to provide the cover heater in the concentric pattern or any other pattern to affectively provide uniform and stable heating across the cover.

....

With respect to claim 9, the applicant argues that the examiner has not provided the motivation to modify the Chow's cover heater to be "formed in a concentric patter around the nozzle." This argument is not deemed persuasive. Chow discloses that it is important to provide a good uniform heat distribution to avoid hot and cold zones (see column 1, lines 60-68) and this would have been the motivation to provide the heating pattern in the concentric pattern. Chow shows a heating wire that encircles a hole or nozzle, and to one of ordinary skill in the art, it would have been desirable to modify the heating pattern in a concentric pattern or any other suitable pattern that would have provided a good uniform heating so that vaporization out of the nozzle is evenly heated. It is also noted that the applicant allows other forms of heating pattern other than a concentric pattern (paragraph 31). This is not the hindsight upon which the examiner has relied but rather this particular applicant's disclosure goes to the non-criticality of the heating pattern of a concentric pattern as opposed to other form of heating pattern as long as a uniform heating pattern can be maintained.

Column 1, lines 60-68, of Chow referred to by the Examiner reads as follows:

addition, the heater temperature as a result is going to be substantially higher than that to which the crucible is desired to be

raised, a situation which causes added outgassing from the heater element and reduces its lifetime. The non-uniform spatial distribution of the heating elements means that the crucible will have resulting hot and cold zones making achieving of temperature uniformity difficult.

Although this passage may arguably be considered to suggest that a uniform spatial distribution of the heating elements may avoid hot and cold zones, it is submitted that nothing whatsoever in this passage would have motivated one of ordinary skill in the art to form Chow's cover heater "in a concentric pattern around the nozzle" as recited in claim 9. Rather, it is submitted that the only suggestion that this be done is contained in the applicants' disclosure, which the Examiner is prohibited from relying on as the source for the motivation required to support a rejection under 35 USC 103 pursuant to MPEP 2143 which provides as follows (emphasis added):

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. (Citation omitted.)

With respect to the Examiner's statement that "[i]t is also noted that the applicant allows other forms of heating pattern other than a concentric pattern (paragraph 31)," the Examiner is apparently referring to the following portion of paragraph [0031] of the applicants' specification:

The cover heater 43 may have a concentric pattern around the nozzle 42, as shown in FIG. 4C. However, any other patterns which can be laid over the entire top surface of the cover 40 can be applied.

The Examiner apparently considers these statements by the applicants to be an admission that the feature of claim 9 "wherein the cover heater is formed in a concentric pattern around the nozzle" is equivalent to any other patterns in which a cover heater may be formed, such as the patterns in which Chow's cover heater is formed, and accordingly, the Examiner is of

the opinion that it would have been obvious to modify Chow's cover heater to be "formed in a concentric pattern around the nozzle" as recited in claim 9.

However, the Examiner's attention is directed to MPEP 2144.06 which provides as follows in pertinent part (emphasis added):

In order to rely on equivalence as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art, and cannot be based on applicant's disclosure or the mere fact that the components at issue are functional or mechanical equivalents. (Citation omitted.)

Accordingly, it is submitted that the Examiner's reliance on paragraph [0031] of the applicants' specification to support the obviousness rejection of claim 9 is improper.

For at least the reasons discussed above, it is submitted that the Examiner has not identified any motivation whatsoever in Chow, Chandler, and Isaacson or elsewhere in the prior art to modify Chow's cover heater to be "formed in a concentric pattern around the nozzle" as recited in claim 9, such that the Examiner has not established a *prima facie* case of obviousness with respect to claim 9 pursuant to MPEP 2143.

Claim 16

It is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the features "wherein the cover heater is constituted by a sprayed heating block on the cover" and "wherein the sprayed heating block is constituted by a sprayed heat emitting material on the cover" recited in dependent claim 16.

In explaining the rejection of claim 16, the Examiner states as follows:

With respect to the method by which the heating element or block is provided on the cover and how such is formed, it is noted that the pending claims are apparatus or product and such is defined by the product itself and not by the process it is produced.

. . . .

With respect to claim 16, it is further noted that such claim is a product by process claim wherein the patentability is defined by the product itself and not by the process. All the structure of

claim 16 is shown, and the applicant's argument is not deemed persuasive.

However, as pointed out on page 17 of the Amendment of July 27, 2006, claim 16 was amended in the Amendment of July 27, 2006, so that claim 16 is no longer a product-by-process claim, such that the Examiner's comments were then and are now no longer applicable to claim 16 in its present form.

Chow's cover heater is constituted by the inner heating element 22' or 22", the insulating layer 23' or 23", and the outer heating element 24' or 24" and is apparently formed the same way that Chow's body heater is formed. Chow's body heater is formed by depositing pyrolytic graphite on the shell 20 by chemical vapor deposition, selectively masking the resulting graphite surface, and etching away the unmasked portions to form the first layer heating element 22; depositing pyrolytic boron nitride on the first layer heating element 22 to form the insulating layer 23; and depositing pyrolytic graphite on the shell insulating layer 23 by chemical vapor deposition, selectively masking the resulting graphite surface, and etching away the unmasked portions to form the second layer heating element 22. See column 3, line 24, through column 4, line 5, of Chow which describes the process of forming Chow's body heater. Thus, Chow's cover heater constituted by the inner heating element 22' or 22", the insulating layer 23' or 23", and the outer heating element 24' or 24" is an etched heating element pattern, wherein the etched heating element pattern is constituted by a chemical vapor deposited heat emitting material, and thus is not "constituted by a sprayed heating block on the cover" as recited in claim 16, "wherein the sprayed heating block is constituted by a sprayed heat emitting material on the cover" as recited in claim 16. In any event, it is submitted that Chow's heating element pattern is clearly not a "heating block" as recited in claim 16 because a "heating block" does not have a pattern.

Claims 29 and 30

It is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the features "wherein the cover heater is a single-layer cover heater" and "wherein the body heater is a single-layer body heater" recited in dependent claim 29, or the features "wherein the single-layer cover heater is the only cover heater on the cover" and "wherein the single-layer body heater is the only body heater on the main body" recited in dependent claim 30 because Chow's cover

heater is a three-layer cover heater constituted by the inner heating element 22' or 22", the insulating layer 23' or 23", and the outer heating element 24' or 24", and Chow's body heater is a three-layer body heater constituted by the first layer heating element 22, the insulating layer 23, and the second layer heating element 24.

In explaining the rejection of claims 29 and 30, the Examiner states as follows:

With respect to the recited single-layer cover or body heater, the applicant shows different layers of Chow including the first and second element with an insulating layer to show that Chow cover is a three layer heater. Applying the same analysis, the applicant's cover heater would be a two layer heater having a heating element and an insulating layer rather than a single layer heater as recited, but nevertheless since the claim 30 seems to indicate the single layer relates to having a single or one cover heater, i.e., the heating element, and since Chow teaches only one heating element can be used, as shown in column 2, lines 27-30, the recited single layer cover heater and the single layer body heater are met by Chow.

However, it is submitted that the applicants' cover heater would not be "a two layer heater having a heating element and an insulating layer rather than a single layer heater as recited [in claims 29 and 30]" under the analysis applied above to Chow's cover heater because the applicants do not disclose any insulating layer corresponding to Chow's insulating layer 23' or 23" disposed between Chow's inner heating element 22' or 22" and Chow's outer heating element 24' or 24". See, for example, the applicants' FIG. 4B in the replacement drawings submitted with the Amendment of March 16, 2006, which shows a cover body 41, a cover heater 43, a reflective layer 47, and a heat-resistant layer 46, but no insulating layer corresponding to Chow's insulating layer 23' or 23".

Furthermore, as discussed above in connection with claims 2 and 18, the passage in column 2, lines 27-30, of Chow referred to by the Examiner (which appears to actually be column 2, lines 26-29, of Chow) relates only to Chow's cover heater, and thus does not disclose the feature "wherein the body heater is a single-layer body heater" recited in claim 29, or the feature "wherein the single-layer body heater is the only body heater on the main body" recited in claim 30.

Furthermore, although the passage in column 2, lines 26-29, of Chow referred to by the Examiner may arguably appear to allude to an embodiment in which a cover heater may have

one heating element, it appears that this is the only place in Chow where such an embodiment is alluded to. The rest of the specification of Chow, the abstract of Chow, all of the claims of Chow, and all of the drawings of Chow disclose embodiments in which a cover heater has two heating elements. In light of this, it appears that the apparent allusion in column 2, lines 26-29, of Chow to an embodiment in which a cover heater has one heating element is an error, such that Chow does not actually disclose or suggest the feature "wherein the cover heater is a single-layer cover heater" recited in claim 29, or the feature "wherein the single-layer cover heater is the only cover heater on the cover" recited in claim 30. Alternatively, assuming *arguendo* that this apparent allusion is not an error, it is submitted that the mere reference to "one or more heating elements on that cover about such an aperture" in column 2, lines 26-29, of Chow does not provide an enabling disclosure with respect to the feature of claim 2 "wherein the entire cover heater is constituted by a single wire pattern." See MPEP 2121.01.

Claim 31

It is submitted that Chow, Chandler, and Isaacson do not disclose or suggest the feature "wherein the heat-resistant layer blocks heat generated by the cover heater from being transferred outside the heating crucible" recited in dependent claim 31, particularly since Chow, Chandler, and Isaacson do not disclose or suggest "a heat-resistant layer formed on a surface of the cover heater" as recited in claim 1 from which claim 31 depends for the reasons discussed above in connection with claim 1. In any event, the Examiner did not specifically discuss claim 31 in the Final Office Action of October 12, 2006, or otherwise address the feature "wherein the heat-resistant layer blocks heat generated by the cover heater from being transferred outside the heating crucible" recited in claim 31.

Claims 4, 11-13, 17, 21, and 22

It is submitted that claims 4, 11-13, 17, 21, and 22 which depend directly or indirectly from claim 1 are patentable over Chow, Chandler, and Isaacson for at least the same reasons discussed above that claim 1 is patentable over Chow, Chandler, and Isaacson.

Conclusion—Rejection 1

For at least the foregoing reasons, it is respectfully requested that the rejection of claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson be withdrawn.

Rejection 2

Claims 3, 14, and 19 were rejected under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Kano et al. (Kano) (U.S. Patent No. 6,242,719). This rejection is respectfully traversed.

It is submitted that claims 3, 14, and 19 which depend directly or indirectly from various ones of claims 1, 2, and 18 are patentable over Chow, Chandler, Isaacson, and Kano for at least the same reasons discussed above that claims 1, 2, and 18 are patentable over Chow, Chandler, and Isaacson. Accordingly, it is respectfully requested that the rejection of claims 3, 14, and 19 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Kano be withdrawn.

Rejection 3

Claims 8, 15, and 26 were rejected under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Bichrt (U.S. Patent No. 6,162,300). This rejection is respectfully traversed.

It is submitted that claims 8, 15, and 26 which depend directly or indirectly from various ones of claims 1, 7, and 25 are patentable over Chow, Chandler, Isaacson, and Bichrt for at least the same reasons discussed above that claims 1, 7, and 25 are patentable over Chow, Chandler, and Isaacson. Accordingly, it is respectfully requested that the rejection of claims 8, 15, and 26 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or

Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Bichrt be withdrawn.

Rejection 4

Claim 10 was rejected under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Okuda et al. (Okuda) (U.S. Patent No. 4,804,823). This rejection is respectfully traversed.

It is submitted that Chow, Chandler, Isaacson, and Okuda do not disclose or suggest the features "wherein the cover heater is constituted by a sintered printed conductive paste on the cover" and "wherein the conductive paste comprises metal particles and metal oxide" recited in dependent claim 10.

As recognized by the Examiner, Chow, Chandler, and Isaacson do not disclose or suggest the features "wherein the cover heater is constituted by a sintered printed conductive paste on the cover" and "wherein the conductive paste comprises metal particles and metal oxide" recited in claim 10. However, the Examiner considers these features of claim 10 to be disclosed by Okuda, and is of the opinion that it would have been obvious to incorporate these features into Chow's device "to adapt Chow, as modified by Chandler or Isaacson, with the cover heater made of conductive paste having the metal particles and metal oxides to form a heating element that can provide a mechanically and thermally stable heater that can also withstand a high temperature."

Although the Examiner did not identify any particular portion of Okuda as support for the rejection, the most relevant passages of Okuda appear to be column 5, lines 26-30, of Okuda which reads as follows:

The heat-generating generator layer containing TiN is formed of a sintered body of (a) titanium nitride, (b) silicon nitride and (c) a sintering aid. As the sintering aid (c), there are used yttria, magnesia and alumina. An especially preferred example of the ceramic composition comprises 40 to 85% by weight of titanium nitride, 20 to 54% by weight of silicon nitride and 1 to 10% by weight of the sintering aid.

and column 6, line 54, through column 7, line 4, of Okuda which reads as follows:

In accordance with still another embodiment of the present invention, the ceramic substrate is composed of a sintered body of silicon nitride and the heat-generating resistor is composed of a tungsten carbide layer. The heat-generating resistor layer of WC is prepared, for example, by sintering a paste containing WC alone.

In the examples of the present invention, the heat-generating resistor paste comprising substantially pure WC, that is, WC having a purity of 99.8%, was used. However, in order to adjust the resistance value of the heat-generating resistor, improve the denseness of the resistor or enhance the bondability to the silicon nitride substrate, up to about 40% by weight of a single substrate, oxide, nitride, carbide or carbonitride of an element of the group IIIA such as Y or an element of the group IIa such as Mg, or the same Si_3N_4 as that of the silicon nitride substrate, may be added to WC. If such an additive is incorporated, the effects of the present invention are not degraded.

Tables 1, 3-4, and 8 in Okuda disclose various examples of the conductive pastes described in above portions of Okuda.

However, it is submitted that Okuda does not disclose or suggest the feature "wherein the conductive paste comprises metal particles and metal oxide" recited in claim 10 because all of the conductive pastes described in the above portions of Okuda and shown in Tables 1, 3-4, and 8 of Okuda comprise metal nitride particles (TiN) and metal oxide (yttria, magnesia, alumina) or metal carbide particles (WC) and metal oxide (yttria, magnesia, alumina), rather than "metal particles and metal oxide" as recited in claim 10. It is submitted that metal nitride particles (TiN) and metal carbide particles (WC) are not "metal particles" as recited in claim 10. Rather, it is submitted that examples of "metal particles" as recited in claim 10 in the context of Okuda would be particles of Ti or W.

Although Tables 2 and 8 of Okuda disclose conductive pastes that comprise "metal particles" (Mo or W) as recited in claim 10, these conductive pastes do not also comprise "metal oxide" as recited in claim 10 as can be seen, for example, from column 8, lines 49-51; column 9, lines 67-68; column 13, lines 1-6; and column 15, lines 59-60, of Okuda. Thus, Tables 2 and 8 of Okuda do not disclose or suggest the feature "wherein the conductive paste comprises metal particles and metal oxide" recited in claim 10.

As can be seen from the preceding discussion, Okuda discloses examples in which a conductive paste comprises the combination of metal nitride particles (TiN) and metal oxide;

examples in which a conductive paste comprises the combination of metal carbide particles (WC) and metal oxide; and examples in which a conductive paste comprises only metal particles (either Mo or W). However, Okuda does not disclose a conductive paste that comprises the combination of "metal particles and metal oxides" recited in claim 10.

The Examiner nevertheless considers Okuda to disclose the feature "wherein the conductive paste comprises metal particles and metal oxide" recited in claim 10, stating as follows in the Final Office Action of October 12, 2006:

With respect to Okuda, the applicant argues that the metal nitride or carbide particles of Okuda do not meet the recited "metal particles". The recited metal particles are particles that are made of metals. The particles of Okuda are made of metals as well. This clearly meets the recited "metal particles". The applicant is invited to show if there is other definition or teaching in the applicant's disclosure that would be distinguishable over the prior art wherein the particles made of metal in Okuda are not the claimed "metal particles". No new matter is to be introduced in the specification.

However, it appears from these comments that the Examiner does not understand the difference between the metal nitride particles (TiN) and metal carbide particles (WC) disclosed in Okuda and the "metal particles" recited in claim 10. Okuda's metal nitride particles (TiN) and metal carbide particles (WC) are not "made of metals" as alleged by the Examiner. Rather, Okuda's metal nitride particles (TiN) are made of the metal Ti and the nonmetal N, and Okuda's metal carbide particles (WC) are made of the metal W and the nonmetal C. Thus, each particle of Okuda's metal nitride particles (TiN) is a particle of TiN, and each particle of Okuda's metal carbide particles (WC) is a particle of WC. Accordingly, it is submitted that Okuda does not disclose a conductive paste that comprises the combination of "metal particles and metal oxides" recited in claim 10.

For at least the foregoing reasons, it is respectfully requested that the rejection of claim 10 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31, and further in view of Okuda be withdrawn.

Rejection 5

Claim 20 was rejected under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 20-25, and 29 (presumably intended to be claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31), and further in view of Takagi (U.S. Patent No. 4,217,855). This rejection is respectfully traversed.

It is submitted that claim 20 which depends directly from claim 18 and indirectly from claim 1 is patentable over Chow, Chandler, Isaacson, and Takagi for at least the same reasons discussed above that claims 1 and 18 are patentable over Chow, Chandler, and Isaacson. Accordingly, it is respectfully requested that the rejection of claim 20 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 20-25, and 29 (presumably intended to be claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31), and further in view of Takagi be withdrawn.

Rejection 6

Claims 27 and 28 were rejected under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 20-25, and 29 (presumably intended to be claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31), and further in view of Chen et al. (Chen) (U.S. Patent No. 6,024,799) or Murakami et al. (Murakami) (U.S. Patent No. 5,728,223). This rejection is respectfully traversed.

Claim 27

It is submitted that Chow, Chandler, Isaacson, Chen, and Murakami do not disclose or suggest the feature "wherein the nozzle is a convergent-divergent nozzle through which the gaseous organic substance comes out from the main body in a diverging pattern, thereby enabling the heating crucible to produce a diverging pattern of the gaseous organic substance" recited in dependent claim 27.

As recognized by the Examiner, Chow, Chandler, and Isaacson do not disclose "a convergent-divergent nozzle" as recited in claim 27. However, the Examiner considers Chen and Murakami to disclose a convergent-divergent nozzle, and is of the opinion that it would be

have been obvious to modify the combination of Chow and Chandler or Isaacson to use the convergent-divergent nozzle of Chen or Murakami "to provide a more defined outlet gas flow for even distribution of the vapor deposition."

However, the Examiner has not identified where Chen and Murakami disclose that the convergent-divergent nozzle is "a convergent-divergent nozzle through which the gaseous organic substance comes out from the main body in a diverging pattern, thereby enabling the heating crucible to produce a diverging pattern of the gaseous organic substance" as recited in claim 27. It is respectfully requested that the Examiner point out where Chen and Murakami disclose that the convergent-divergent nozzle produces "a diverging pattern" as recited in claim 27 in the next Office Action, even if that Office Action is an Advisory Action.

Furthermore, assuming *arguendo* that Chen and Murakami disclose a convergent-divergent nozzle that produces "a diverging pattern" as recited in claim 27, it is submitted that it would not have been obvious to use this convergent-divergent nozzle in the combination of Chow and Chandler or Isaacson as proposed by the Examiner because Figs. 5-6 and column 6, lines 36-50, of Chow disclose that Chow's crucible 10 produces a converging material beam, and column 6, line 66, through column 7, line 5, of Chow discloses that the single aperture 19' in Fig. 7 "can also provide material beam directivity," apparently meaning a converging material beam in light of column 6, lines 36-50, of Chow referred to above and in light of column 2, lines 14-16, of Chow which states that "[t]here is desire for a source which can provide a material beam displaying good directivity." It is submitted that one of ordinary skill in the art would understand the phrases "material beam directivity" and "a material beam displaying a good directivity" to mean a converging material beam.

The Examiner's attention is directed to MPEP 2143.01(V) (see MPEP page 2100-129) which provides as follows in pertinent part (emphasis added):

If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. (Citation omitted.)

Here, as discussed above, one of the intended purposes of Chow's crucible 10 is to produce a converging material beam. Assuming *arguendo* that Chen and Murakami disclose a convergent-divergent nozzle that produces "a diverging pattern" as recited in claim 27, it is submitted that using this convergent-divergent nozzle in Chow as proposed by the Examiner

would produce a diverging material beam, thereby rendering Chow's crucible 10 unsuitable for its intended purpose of producing a converging material beam. Accordingly, pursuant to MPEP 2143.01(V), it is submitted that there is no suggestion or motivation to modify Chow's crucible 10 to use Chen and Murakami's convergent-divergent nozzle, such that the Examiner has not established a *prima facie* case of obviousness with respect to claim 27.

In response to similar arguments, presented in the Amendment of July 27, 2006, the Examiner states as follows in the Final Office action of October 12, 2006:

With respect to the recited "convergent-divergent nozzle", the applicant argues Chow shows a converging material beam because Chow shows its beam to having a "good directivity". Having a good directivity does not necessarily mean "converging" beam as argued by the applicant. In fact, the nozzle 19' in Figure 7 of Chow shows a nozzle with widening open end as the beam is let out. This creates more of a divergent pattern than a converging pattern. This clearly shows why the good directivity does not necessarily mean a converging outlet.

However, the Examiner has apparently ignored the fact that Figs. 5-6 and column 6, lines 36-50, of Chow clearly disclose that Chow's crucible 10 produces a converging material beam. Furthermore, assuming *arguendo* that nozzle 19' in FIG. 7 of Chow produces "more of a divergent pattern than a converging pattern" as alleged by the Examiner, and that Chen and Murakami disclose a convergent-divergent nozzle that produces "a diverging pattern" as recited in claim 27, it is submitted that there would have been no motivation for one of ordinary skill in the art to replace Chow's nozzle 19' with the convergent-divergent nozzle disclosed by Chen and Murakami as proposed by the Examiner because Chow's nozzle 19' already produces "more of a divergent pattern than a converging pattern" as alleged by the Examiner.

Claim 28

It is submitted that Chow, Chandler, Isaacson, Chen, and Murakami do not disclose or suggest the features "wherein the nozzle extends from a surface of the cover facing toward the main body to a surface of the heat-resistant layer facing away from the main body; wherein an entry opening of the nozzle through which the gaseous organic substance enters the nozzle is flush with the surface of the cover facing toward the main body; wherein an exit opening of the nozzle through which the gaseous organic substance exits from the nozzle is flush with the

surface of the heat-resistant layer facing away from the main body; and wherein the nozzle converges from the entry opening to a throat of the nozzle at a junction between the cover and the heat-resistant layer, and diverges from the throat of the nozzle to the exit opening" recited in dependent claim 28.

As recognized by the Examiner, Chow, Chandler, and Isaacson do not disclose the feature "wherein the nozzle converges from the entry opening to a throat of the nozzle . . . , and diverges from the throat of the nozzle to the exit opening" as recited in claim 28, which the Examiner apparently considers to be a recitation of a convergent-divergent nozzle. However, the Examiner considers Chen and Murakami to disclose a convergent-divergent nozzle, and is of the opinion that it would be have been obvious to modify the combination of Chow and Chandler or Isaacson to use the convergent-divergent nozzle of Chen or Murakami "to provide a more defined outlet gas flow for even distribution of the vapor deposition."

However, all of the convergent-divergent nozzles disclosed in Chen and Murakami are formed in a solid block of material that has no layers, such that Chen and Murakami do not disclose or suggest at least the feature "wherein the nozzle converges from the entry opening to a throat of the nozzle at a junction between the cover and the heat-resistant layer, and diverges from the throat of the nozzle to the exit opening" recited in claim 28. The applicants also pointed this out in the paragraph bridging pages 25-26 of the Amendment of July 27, 2006, but the Examiner did not respond to these arguments or otherwise address this feature of claim 28 in the Final Office Action of October 12, 2006.

Conclusion—Rejection 6

For at least the reasons discussed above, it is respectfully requested that the rejection of claims 27 and 28 under 35 USC 103(a) as being unpatentable over Chow in view of Chandler or Isaacson as applied to claims 1, 2, 4, 7, 9, 11-13, 16-18, 20-25, and 29 (presumably intended to be claims 1, 2, 4, 7, 9, 11-13, 16-18, 21-25, and 29-31), and further in view of Chen or Murakami be withdrawn.

Conclusion

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

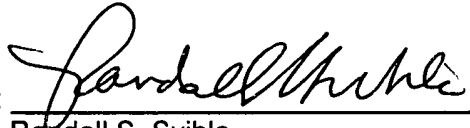
Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this paper, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

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